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SoundPrint: Continuous Acoustic Monitoring for Structure

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SOUNDPRINT: CONTINUOUS ACOUSTIC MONITORING FOR STRUCTURE

THE NEED

The effective evaluation and management of corrosion in unbonded post-tensioned tendons requires an understanding of the causes of corrosion as well as an appreciation of the measures required to mitigate future corrosion. Present evaluation methods have been unsuccessful in accurately assessing the existing condition of post-tensioned structures. Continuous monitoring technology allows engineers to locate future failures so that property owners can implement cost-effective management strategies.

THE TECHNOLOGY

An acoustic monitoring system, SoundPrint® has been developed which allows continuous monitoring of entire structures (see Figure1).

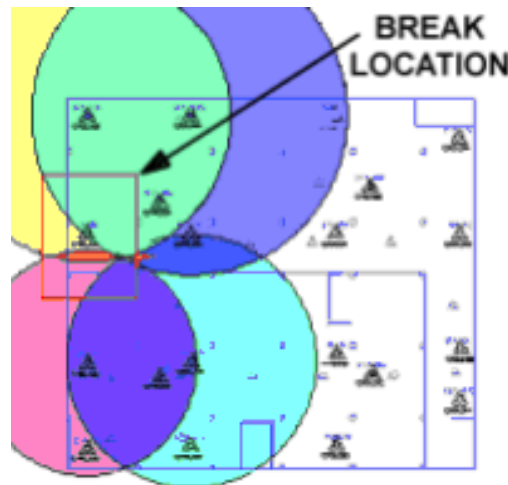


FIGURE 1 BREAK LOCATION: THE SPOT WHERE ALL FOUR CIRCLES OVERLAP IN THE SHADED AREA INDICATES WHERE THE BREAK OCCURRED

Acoustic energy released when a prestressed wire breaks is detected by sensors mounted on the structure. The information generated by the sensors is transmitted to an on-site data acquisition and signal processing unit. Recorded data is downloaded periodically to a processing centre, where proprietary software is used to analyse and classify events.



Reports are issued tabulating the time and location of probable wire breaks (see Figure2). This information helps structural engineers and their clients to ensure long-term structural integrity through periodic replacement of broken tendons.

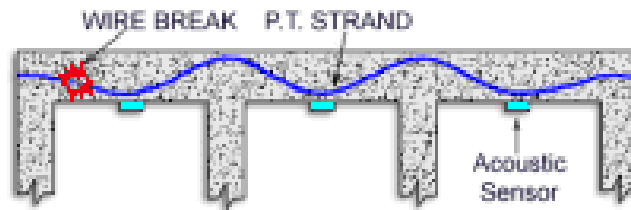


FIGURE 2 ACOUSTIC SENSORS

The ability to calculate the frequency of wire breaks allows statistical techniques to be used to predict the probability of future failure rates and to assess the probable extent of past failures. Budgets for future repairs can then be developed.

Localized areas of high failure rates may indicate structural inadequacy, requiring further investigation and possible repair.

THE BENEFITS

- SoundPrint® Acoustic Monitoring Technology "listens" to structures for wire or strand failure...24 hours a day. And it's non-destructive
- SoundPrint® Analyst software identifies, locates and reports prestressing failures so that deterioration can be managed pro-actively and cost-effectively.
- Results from installed systems have shown that structures can be maintained in satisfactory condition at a fraction of the cost of large scale repairs.
- The structures can be monitored continuously from remote place via the Internet.

STATUS

SoundPrint was invented in 1994 to address concerns about corrosion in unbonded building and parking structures in Western Canada. Pure Technologies, of Calgary, Alberta, is currently marketing this innovation for two applications in highway. This technology is currently under evaluation of CERF's HITEC. Testing of the system for use on grouted post-tensioned bridges is presently underway in the United Kingdom and applications on suspension bridge cables and cable stays are anticipated in the near future.

BARRIERS

Applications on on grouted post-tensioned of this technology is still under evaluation.



POINTS OF CONTACT

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REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

Purdue University does not endorse this technology or represents that the information presented can be relied upon without further investigation.

PUBLISHER

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